Appendix G: Comparative Summary of the Impacts of Parameter Changes in Model Sensitivity Analysis

HYDROLOGIC PARAMETER	RANGE OF VALUES	NET INFLOW FROM GILA RIVER (acre feet/year)	GW OUTFLOW TO NW (acre feet/year)	NET FLOW TO BONITA CR. (acre feet/year)
Hydraulic conductivity of the Butte fault zone (feet/day)	Higher 1.23 E-3 ft/d [1]	18,861 (-0.04%)	3,706 (0.05%)	138 (-6.93%)
	2002 Model 2.46 E-4 ft/d	18,869	3,704	148
	Lower 2.21 E-4 ft/d [2]	19,139 (1.43%)	3,703 (-0.04%)	149 (0.37%)
Hydraulic conductivity of the volcanic bedrock south of the Butte fault (feet/day)	Higher 1.6 E-3 to 82 [1]	18,870 (0.14%)	3,712 (0.21%)	137 (-7.45%)
	2002 Model 2.3 E-4 to 16.4	18,869	3,704	148
	Lower 4.6 E-5 to 3.28 [3]	18,895 (-2.33%)	3,697 (-0.19%)	180 (21.65%)
Hydraulic conductivity of the volcanic bedrock north of the Butte fault (feet/day)	Higher 1.6 E-3 to 4.1 E-2 [1]	18,435 (-2.33%)	3,779 (2.03%)	-375 [4]
	2002 Model 2.3E -4 to 8.2 E-3	18,869	3,704	148
	Lower 2.07 E-4 to 7.37 E-3 [2]	18,886 (0.09%)	3,701 (-0.08%)	168 (13.31%)
Net inflow from Peloncillo mts., San Simon valley, and Pinaleno mts.(acre feet/year)	Higher 35,000	16,761 (-11.17%)	3,823 (3.22%)	149 (0.41%)
	2002 Model 32,771	18,869	3,704	148
	Lower 11,000	37,040 (96.30%)	2,523 (-31.89%)	142 (-3.89%)
Hydraulic conductivity of the Lower Basin Fill aquifer (feet/day)	Higher 500	18,939 (0.37%)	3,774 (1.86%)	148 (-0.20%)
	2002 Model 10.6 to 11.2	18,869	3,704	148
	Lower 1	18,804 (-0.34%)	3,639 (-1.76%)	148 (0.15%
Hydraulic conductivity of the lakebeds of the Lower Basin Fill (feet/day)	Higher 10	14,198 (-24.75%)	1,212 (-67.27%)	138 (-6.48%)
	2002 Model 0.394	18,869	3,704	148
	Lower 0.1	21,818 (15.63%)	6,546 (76.73%)	171 (15.59%)
Mountain Front Recharge (acre feet/year)	Higher 6000 [5]	14,995 (-20.53%)	4,030 (8.81%)	196 (32.38%)
	2002 Model 4,900	18,869	3,704	148
	Lower 4000 [6]	19,487 (3.28%)	3,579 (-3.37%)	26 (-82.40%)
Riverbed conductance of the Gila River (feet²/day)	Higher Variable [1]	18,614 (-0.29%)	3,707 (0.09%)	150 (1.50%)
	Average ~ 42,000	18,869	3,704	148
	Lower Variable [3]	20,079 (6.41%)	3,374 (-8.90%)	146 (-1.45%)
Net Irrigation Pumpage in the Safford Valley (acre feet/year)	Higher 63,220	28,385 (50.43%)	3,689 (-0.40%)	148 (-0.06%)
	2002 Model 52,683	18,869	3704	148
	Lower 42,146	8,036 (-57.41%)	3720 (0.44%)	148 (0.21%)

[1] 2002 Model values for cells multiplied by 5.

[2] 2002 Model values for cells multiplied by 0.9.

[3] 2002 Model Value for cells divided by 5.

[4] The computed flow contains an unknown amount of error due to the use of the MODFLOW river package in the simulation of Bonita Creek. Had the MODFLOW stream package been used (planned change in the first model recalibration), the higher value of hydraulic conductivity would have probably flattened the hydraulic gradient bringing water to the stream, and causing the ground water divide to shift to the south. A southward shift in the divide would result in a greater area of recharge being included in the area contributing water to Bonita Creek, leading to an increase in the flow of Bonita Creek.

[5] 2002 Model value for cells multiplied by 1.22.

[6] 2002 Model value for cells multiplied by 0.82